

A NOTE ON REARING THE BROOD OF POLISTES  
FUSCATUS, FABRICIUS (HYMENOPTERA—  
VESPIDÆ)

On several occasions during the past season, it has been my fortune to collect several nests of *Polistes fuscatus*, Fabricius. As it was expedient to kill off all the adults in collecting the nests, the brood had no means of securing nourishment. It was decided to attempt to rear the existing brood, which ranged from eggs to nearly matured pupæ.

The larvæ required both a liquid and solid diet. The liquids were administered to each larva through a small glass pipette. A drop of juice or water slightly smaller than the head of the larva was discovered to be sufficient for one drink; naturally this volume would vary with the size of the larva. All larvæ greedily accepted tap water and would occasionally accept a dilute aqueous solution of glucose or saccharose. Upon occasion the smaller larvæ would accept the offerings of pasteurized milk but this was not consumed with any avidity.

The solid diet was prepared by chopping small bits of meat into fragments about one half of one cubic millimeter in volume and then making a paste out of the mass by the addition of water. This kept the meats juicy and permitted the larvæ to handle the particles more easily. Forceps with medium size jaws were used in administering the solid foods; as much food as would adhere to the forceps through capillarity was sufficient to feed one large larva. Raw and cooked beef, lamb and chicken, prepared as above, were readily eaten as were liverwurst and ham (spiced).

Two or three feedings and as many drinks every day were enough to satiate the greedy larvæ and permitted them to grow at a reasonable rate.

The absence of trophallactic relations with adults seemed not to have an effect on the development of the brood, although at all times the larger larvæ would produce their trophallactic secretions when touched upon the head. These larvæ would indulge in autotrophallaxis by imbibing their own secretions, independently of how well they were fed. This imbibition seems

necessary for the maintenance of nest cleanliness as the paper would soon become sodden and moldy if the secretion were not removed; it therefore seems that autotrophallaxis might be a practical habit rather than an indication of weakness in the colony.

To gain access into the deep cells in the middle of the nests, it was found expedient to tear away the paper walls of the cells. When the larvæ in these cells began to pupate they could not produce enough silk to build up their compartments. Indeed, they had no instinct for repairing the nest. One larva even tried to build a cocoon cap attached only to the head of an adjacent larva.

To circumvent this difficulty, two types of artificial cell were made. One was a block of wood bored with holes 5 mm. in diameter and 16 mm. in depth; the other was a set of 5 mm. diameter paper tubes. When the large larvæ were observed to move their heads about in the circular motion characteristic of the pre-pupating *Polistes*, or when they would accept no further food, they were removed from the original nest and placed in either the wooden block or the paper tubes. These served as a satisfactory substitute for the nest as the larvæ spun their white silk pupal caps over the apertures and settled down to pupation. Perfectly normal adults emerged in due time.

Adults that emerged prior to the pupation of the last larva were removed that they might not interfere with the experiments.

The span of life of the larvæ could be varied at will by increasing or decreasing the feeding. Fifteen days to six weeks were spent in the larval stage by individuals that were respectively overfed and nearly starved. The average pupation period was nineteen days with the temperature varying from 66 to 87 degrees F.

The only real difficulty encountered in rearing the brood was in feeding the smaller larvæ whose capacity was so small that even the smallest portions offered them could not be completely consumed. This created a problem in nest cleanliness, so the excess had to be carefully removed after each feeding.

Another important consideration in the health of the brood was sufficient ventilation. In closed or poorly ventilated con-

tainers, the formation of molds caused a high mortality among both larvæ and pupæ. Nests fully exposed on a shelf or table remained free from molds although precautions were necessarily taken against the predatory activities of ants.

The inverted position of the nest seemed not to interfere with the more or less normal development of the young.

By virtue of the few precautions mentioned, it was found practicable to rear adult *Polistes* from eggs, thus entirely supplanting the natural relations between adult and brood. Although the trick of rearing *Polistes* is of no great consequence, the possibility of supplanting the adults may lead to further investigations on their social conduct.—ALBRO TILTON GAUL.

### BOOK NOTICE

*Introducing Insects, A Book for Beginners.* By James Needham, with illustrations by Ellen Edmonson. The Jaques Cattell Press, Lancaster, Pennsylvania, 1940.  $7\frac{1}{2} \times 5\frac{1}{2}$  inches. vi + 129 pp., illus. \$1.50 postpaid.

This is a slim, attractively bound, well printed volume by a well-known entomologist whose writings always command respect, and attention. In it, Dr. Needham refrains from "humanizing" his subjects and also from treating them in journalistic style, which methods are commonly used by writers in attempting to popularize insects. Instead he introduces the insects as they really are, in simple language free of technicalities, and his examples are all species that one meets within everyday life in the home, in our possessions, in our food, and in our rambles in fields and along roadsides.

In addition to sections on butterflies, dragonflies, common caterpillars, leaf-eating beetles, mosquitoes, insects that eat our food, etc., there are sections devoted to collecting and rearing insects, and to the importance and pleasure of studying them.

It is a good book for the young or old beginner in entomology and for the citizen of any age who is inquisitive enough to want to know something reliable about the creatures with which he comes in contact at various times during his lifetime, and the numerous illustrations in the text add to its merit.—H. B. W.